What is claimed is:

1. A microscope comprising:

two objectives between which a light-transmitting specimen is arranged;

said objectives having at least substantially identical optical characteristics; and

at least one of said two objectives being followed by a mirror for reflecting light transmitted through the specimen back into itself exactly.

2. The microscope according to claim 1, wherein the two objectives have the same numerical aperture and the same other characteristics, wherein both objectives are constructed as planapochromats with a numerical aperture greater than or equal to 1.4.

3. The microscope according to claim 1, with incident illumination and field transmission of an image information, wherein one of the objectives serves as a microscope objective and the second objective is part of a reflecting device through which the specimen is imaged onto itself with lateral and vertical accuracy.

4. The microscope according to claim 1, wherein diaphragms, Wollaston prisms, polarizers or subassemblies for optical contrasting are arranged in a beam path.

5. The microscope according to claim 1, but with a coherent illumination source in which one of the mirrors is constructed as a phase-conjugating mirror.

6. The microscope according to claim 1, wherein a dichroic beam splitter is provided for reflecting into the illumination source.

7. The microscope according to claim 1, wherein another mirror is provided between the microscope objective and eyepiece, the specimen being imaged on this mirror through the microscope objective, wherein this mirror passes the illumination beam but does not pass a selected beam component, preferably fluorescent radiation, coming from the specimen.

8. The microscope according to claim 1, constructed as a laser scanning microscope, wherein one of the objectives serves as a microscope objective and the second objective is part of a reflecting device having a phase-conjugating mirror or an adaptive mirror by which the wavefront of the reflected light is made to coincide with the wavefront of the transmitted light.

9. The microscope according to claim 8, wherein the adaptive mirror (23) is provided with a deformable mirror surface arranged on a diaphragm, and a plurality of individual electrodes are located opposite the diaphragm on its side remote of the mirror surface , and electric voltage is applied to the diaphragm on the one hand and to the electrodes on the other hand, and the deformation of the diaphragm is brought about by changing the voltages and electrostatic forces acting between the diaphragm and electrodes.

10. The microscope according to claim 9, wherein the electrodes communicate with a detection device for a beam component which is coupled out of an observation beam path, with fluorescent radiation proceeding from the specimen.

11. The microscope according to claim 1, wherein the reflecting device is constructed as a brightfield arrangement having two objectives which together form an optical system with an infinite output intersection length.

12. The microscope according to claim 1, wherein the reflecting device can be swiveled out of the microscope beam path and a photomultiplier can be swiveled in its place for transmitted-light detection.

13. The microscope according to claim 1, wherein at least one of the objectives is connected with adjusting devices for displacement in axial and/or radial direction and the adjustment is carried out depending on the observation beam path with respect to its intensity or contrast.

14. The microscope according to claim 12, wherein the adjusting devices are coupled with drive elements.

15. The microscope according to claim 12, wherein said drive elements are piezomechanical drive elements.

16. The microscope according to claim 1, wherein there is a detector for a beam component which is coupled out of an observation beam path, with fluorescent radiation proceeding from the specimen.

17. The microscope according to claim 8, wherein the adaptive mirror is provided with a deformable mirror surface arranged on a diaphragm, the diaphragm is connected, on its side remote of the mirror surface, to a plurality of individual piezoelectric drives and the deformation of the diaphragm is brought about by controlling the piezoelectric drives.

18. The microscope according to claim 17, wherein the piezoelectric drives communicate with a detection device for a beam component which is coupled out of the observation beam path, with fluorescent radiation proceeding from the specimen.

19. A microscope comprising:

two objectives between which a light-transmitting specimen is arranged;

said objectives having at least substantially identical optical characteristics; and

at least one of said two objectives being followed by a phase-conjugating mirror for reflecting light transmitted through the specimen back into itself exactly with respect to direction and phase front; and

a detector for receiving reflected specimen fluorescent radiation from the light transmitting specimen.

20. A confocal laser scanning microscope for examining a light transmitting specimen comprising:

a laser for providing excitation light to the light transmitting specimen to induce fluorescence in the specimen whereupon the excitation light and the fluorescence is transmitted through the specimen;

two objectives between which the light-transmitting specimen is arranged;

a first pinhole diaphragm located between the laser and the objectives;

said objectives having at least substantially identical optical characteristics;

at least one of said two objectives being followed by an optically adaptive mirror or phase conjugating mirror for reflecting the excitation light and the fluorescence transmitted through the specimen back into the specimen exactly to improve contrast;

a detector for receiving specimen fluorescent radiation from the light transmitting specimen;

a second pinhole diaphragm located between the objectives and the detector.